



# How to develop your own Audit program in **4 easy steps**

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# How to develop your own Audit program in 4 easy steps

## An e-tutorial for clinicians in 4 chapters

It is important to know that improving quality standards within your practice (public or private) may not necessarily require new and expensive equipment, additional staff or huge expenses. This tutorial aims to demonstrate how a little investment of time & thinking can have a profound impact on your clinical outcomes.

The benefits of performing a clinical audit are many and varied

- Audit has been shown to **decrease the incidence of surgical complications** significantly. Noteworthy examples include; In general surgery, a study from Victoria (AUS) has shown that the anastomotic leak in colorectal surgery rate was cut to half simply by the introduction of clinical audit. In a vascular surgery study (also from Victoria, AUS), the incidence of stroke and unintended limb amputations significantly decreased with the introduction of audit in a vascular surgery setting.
- **Audit** will also provide you with useful data on your surgical outcomes in case of a legal challenge. How often have you done a procedure and what were their outcomes?
- Increasingly, audit is being made a mandatory requirement by **Colleges and professional standards bodies** rewarding their members with CPD points.
- **Better health outcomes** will not only benefit patients, but also the surgeon. Complications cause enormous stress to both the individual and their families (Varughese, Janda & Obermair: ANZJOG 2014). Reduced complication rates and happier patients may even lead to improved job satisfaction.
- In a recent article we found that audit was **hugely cost effective**. We modelled that a single colorectal surgeon who operated on 20 cancer cases per year could save between \$25,000 and \$50,000 annually by engaging in clinical audit (Gordon & Obermair: BMC Surgery 2010).

## About the Author

**Professor Andreas Obermair** is a gynaecological oncologist specialising in complex pelvic gynaecological surgery.

He is also the Founder of SurgicalPerformance.com, a surgical audit software program supporting clinicians in their endeavours to improve patients' outcomes from surgical treatment.



# This e-Tutorial course will be delivered to you in **four chapters:**

## Chapter 1

(Pages 4-6)

### **The Patient Perspective**

In this chapter you will learn how to collect information revealing how well you perform from a patient's perspective and how your patients believe you can improve their experience during their health care episode.

## Chapter 2

(Pages 7-12)

### **Metrics**

Here you will learn the most basic methods of introducing metrics of treatment-related health outcomes into your practice.

## Chapter 3

(Pages 13-16)

### **Morbidity & Mortality (M&M) meetings**

This component will focus on the issue of Morbidity & Mortality (M&M) meetings. The chapter will explain case selection, ground rules and the format of M&M Meetings. It will also explore issues around confidentiality.

## Chapter 4

(Pages 17-21)

### **Checklists**

The final chapter will explain how effectively using checklists can help you to reduce errors before, during and after surgical procedures.

Have fun!

# The Patient Perspective

## How satisfied are your patients with the service you currently provide?

Patients are virtually unable to tell how good a surgeon you really are. Instead, patients will comment on what their scar looks like, how comfortable they felt discussing their issues with you and how they perceived their overall “healthcare episode” (e.g., hospital admission) experience.

Many of your patients will form an opinion about your friendliness, timeliness and professional conduct at various points before, during and after you actually look after them.

In addition, patients will not differentiate between the service they receive from you and other professionals who are associated with you (hospital administration staff, ward nurses, anaesthetist, pathology services, etc.). While you are unable to control the actions of others, they will have an influence on whether or not a patient will recommend your services.

### Did you know?

- Every patient who is incredibly happy with your service will tell an average of **four other prospective patients** and recommend you.
- Every patient who is decidedly unhappy about your service (or part of your service) will tell an average of **11 prospective patients** and recommend that friends do not see you.

The reality is that we will experience a mix of both types of patients regularly. Obviously, we would all prefer to have more patients who are outrageously pleased with our service experience than patients who are seriously unhappy about us...

### The Impact of Not Knowing

**Not knowing** how your patients perceive the services you provide will inhibit your efforts in developing your practice and affect patient satisfaction.

**Not knowing** could limit your ability to provide a service which could very easily be better than it currently is.

**Not knowing** about your patients' experience comes to a blind-flight that can too easily end in great difficulties.

## Creating a Survey

During this step, ask yourself all the questions that you have personally always wanted to know from your patients. Note, I never ask my patients any more than 10 questions. So that they can complete the survey in no more than five minutes.

### Some examples

- How easy is it for you to **phone** the practice? (How many rings does it take for the phone to get answered?)
- How easy was it for you to **locate** the practice?
- How friendly do you find my **meet-and-greet staff** (receptionists) to be?
- How satisfied were you with **my consultation** before and after surgery?

Do you have any other staff that you wish to survey? (E.g., midwife, practice nurse, trainee) You may seek insight into the following areas:

- How well did the postoperative **pain control** work?
- How fair do patients find **your fees**?
- How fair do patients find **your anaesthetist's fee**?

These questions can be simple with tick boxes. Please refer to the example below:

Practice Nurse	Very Satisfied (1)	Satisfied (2)	Unsure (3)	Un-satisfied (4)	Very Un-satisfied (5)
How satisfied were you with the services provided by the practice nurse at initial consultation?	<input type="checkbox"/>				
How satisfied were you with the follow-up (via phone) by the practice nurse after your surgery?	<input type="checkbox"/>				

**HOWEVER**, the most important question to ask is an open-ended one:

- "If there was one thing our practice could do better, what would that be?"

Leave a few lines of free text for patients to answer it.

## Conduct a Pilot Test

You need to make certain that patients understand the questions; the questions must be clear (not ambiguous), they should have a single focus and should be easily answerable.

You will only require a handful of real patients (who you will ask to take the questionnaire) to validate your questions. It will also shed light on how much time you should request from your patients to complete the survey.

## Notify all People Subject to Survey

All people who are a subject of the survey (e.g., reception staff, anaesthetist) should be notified that the survey is indeed underway. It will motivate them to consistently provide great service and will also avoid creating the impression you are "spying" on them.

You do not require Human Research Ethics Committee (HREC) or Institutional Review Board (IRB) approval (National Statement on Ethical Conduct in Human Research 2007) because your activity is audit only and audits do not need to be approved by the local HREC/IRB in most countries. Some Colleges will grant Continuing Professional Development points. Please contact them directly for their instructions.

## Post the Survey

Post the survey to your patients at a point in time when the treatment episode is well and truly over, but when patients still have a memory of the key issues associated with their experience. I usually post my survey to patients between 4 and 8 weeks after surgery.

## Collect and Review the Completed Survey

You can email or post the survey with a return envelope depending on your patients' demographics.

Pay special attention to the text fields. You will generally find that patients are willing to share their experience (both positive and negative) with you. Mostly, it becomes clear they are very grateful for what you have done for them.

## Enter the Outcomes into a Database

Each quarter, or whenever you do your business statistics, enter your survey results into a spreadsheet and analyse them. In addition to this, you can relay some of the information you collected by offering feedback to those you surveyed.

While it can be done in a very informal and friendly way, it doesn't hurt for your team to know that you do keep an eye on things. In fact, it's essential!

## Respecting Anonymity

I have found that patients appreciate the opportunity to provide feedback anonymously. More recently, I added a field and offered patients the opportunity to leave their contact details should they wish to be contacted.

## Implementing Patient Suggestions

Obviously, not all feedback will be useful and from all the insight you receive, you will need to decide if you wish to implement any patients' suggestions.

If patients comment that the colour of your walls in your office look "dark", you need to decide what you wish to do with that information.

If this particular feedback arises frequently, you should probably consider developing an action plan. If this or similar comments are made as a one-off, you can also choose to ignore it and instead focus on something more important or urgent.

### My personal experience with patient surveys

I have found that:

1. A large number of patients are happy to provide feedback (~80%);
2. My patient surveys were eye openers for my staff and me and an opportunity for us all to learn how to make my practice more consumer friendly.
3. Accepting feedback and using it to improve your practice improves not only the quality of the service that you provide, but will also enhance the team spirit within the practice.

Hopefully you are now ready to begin creating your survey and gathering insights into how patients perceive the services you provide. Good Luck!

### What's next?

I hope you enjoyed the **first chapter** on **the patient perspective** and how to use surveys to enhance your health care service. Chapter two will teach you the most basic methods of introducing **metrics** of treatment-related health outcomes into your practice. **I wish you happy learning!**

# Analysing Clinical Outcomes

## Clinical Outcomes

Great surgeons commit to constantly improve the service we offer to our patients. By frequently and thoughtfully reviewing our clinical outcomes, we can build benchmarks that drive the ongoing improvement of our specialist practice.

Most elements of the service we provide can be measured, from the length of a patient's hospital stay or the incidental finding of malignancy, to post-operative complications.

Carefully documenting, organising and analysing clinical outcomes is a vital part of our role as a surgeon, and the following chapter will explore the most effective means of achieving this.

### A Fictional Case: Dr MD relocates his practice (involuntarily)

Dr MD is an aspiring surgeon who opens his practice in a metropolitan area within a private hospital complex.

His practice goes well and his referrals climb steadily. There is a rumour that colleagues have become slightly jealous of the growing success of his practice. Industry gossip begins to emerge that he would be "difficult to deal with" and has had "issues" at places he worked previously as a trainee.

Dr MD operates on a patient who develops a severe adverse event postoperatively which results in the death of the patient. A coronial autopsy is performed and the hospital conducts an independent investigation into Dr MD's practice.

For the duration of the investigation Dr MD's surgical privileges and admitting rights are suspended. Instead of practicing medicine, Dr MD spends the next few months reviewing every single chart of his many patients to table his clinical outcomes.

In the meantime the coroner's findings suggest that Dr MD acted appropriately and according to what can be expected from an experienced specialist. After three months the hospital concludes that Dr MD's outcomes are at least not worse than expected for his speciality. Dr MD has moved his practice to another site to start all over again.

### The Impact of Not-Knowing

I suspect that had Dr MD continuously audited himself, results on his clinical outcomes would have been readily available at any time. The availability of these outcomes could have saved Dr MD several months worth of stressful desk work.

It may even have discouraged Dr MD's colleagues to question the safety of his practice, or the hospital to suspend his clinical privileges.

## Database (electronic) or Logbook (paper)

Firstly, the bare minimum reporting tool you need is a logbook (notebook) of patients that you treat, plus a way of flagging the cases which “stand out” so you can find them if needed. Such a system is feasible if your caseload is rather small.

For example if you do less than 10 operations of a certain type per year, it would be very easy to keep track of your procedures (paper cards). Upon request, you only need to pull a few charts and can retrieve more detail from those in case you need to. You will need to make sure to comply with privacy regulations so that this information cannot be obtained unlawfully by others.

It is unlikely that your practice management software will cater for the task. In logging your patients, it is critical that you capture all cases, otherwise your critics can accuse you of selecting only the ones with favourable outcomes.

Certain procedures can be coded (Medicare item numbers) in more than one way using practice management software. While it does allow you to pull item numbers, certain surgical procedures can be coded using a variety of item numbers in Australia.

In addition, most practice management software often does not record or code for standard quality indicators.

Another option is to start an excel spreadsheet, which will put you in a great position to begin an electronic logbook. You should always password protect your file. You should also specify the data fields in order to minimise data entry errors (acceptable range for data values/internal validation).

### Widely accepted outcome parameters include:

- Anaesthetic incident
- Visceral injury (bowel, bladder, ureter)
- Vascular injury
- Transfusion of red cells (any)
- Conversion to laparotomy <if primary approach was laparoscopy>
- Hospital stay > 7 days
- Medication error
- Incidental finding of a malignancy
- Any unplanned readmission within 30 days from first operation
- Any unplanned return to theatre within 30 days from first operation
- Unplanned admission to ICU
- Thrombo-embolic event (PE/DVT) within 3 months from first operation
- Postoperative fistula (bladder, ureter, bowel)
- Death within 30 days from first operation

## Audit Software Tools

Alternatively, SurgicalPerformance is a sophisticated and surgeon friendly software audit tool that will provide you with a web-based database that is secure (secure login, password) and the data transfer is secure and protected.

SurgicalPerformance also allows users to lock outcomes data with a 4-digit PIN. Hence, your staff/trainee could enter data but not get access to your clinical outcomes.

It can be used for general gynaecology, obstetrics, and colposcopy. It's web-based outcomes reporting is available 24/7.

However, the heart of your QA project is not data entry but the information that is fed back to you. Widely accepted evidence from almost every specialty suggests that feedback enhances and improves your practice and clinical outcomes.

Most research published on audit suggests that surgical adverse events can be reduced by 30% to 50% through audit alone.

## Modes of Receiving Feedback on Outcomes

### Patients lists

You can search for and print a list of your patients and study outcomes (raw data). Not only looking at raw data may make you proud of your achievements, but it might also help you to develop a hypothesis about associations between variables that you can later put to the test. For example, I have found that when I operate on a patient with condition X, the incidence of outcome Y is higher.

The clues may become more “hidden” or ambiguous as your patient list size grows, but your dataset will become increasingly powerful in proving your hypothesis. Patient lists can be used to provide basic documentation but also to apply for re-accreditation at a hospital if needed.

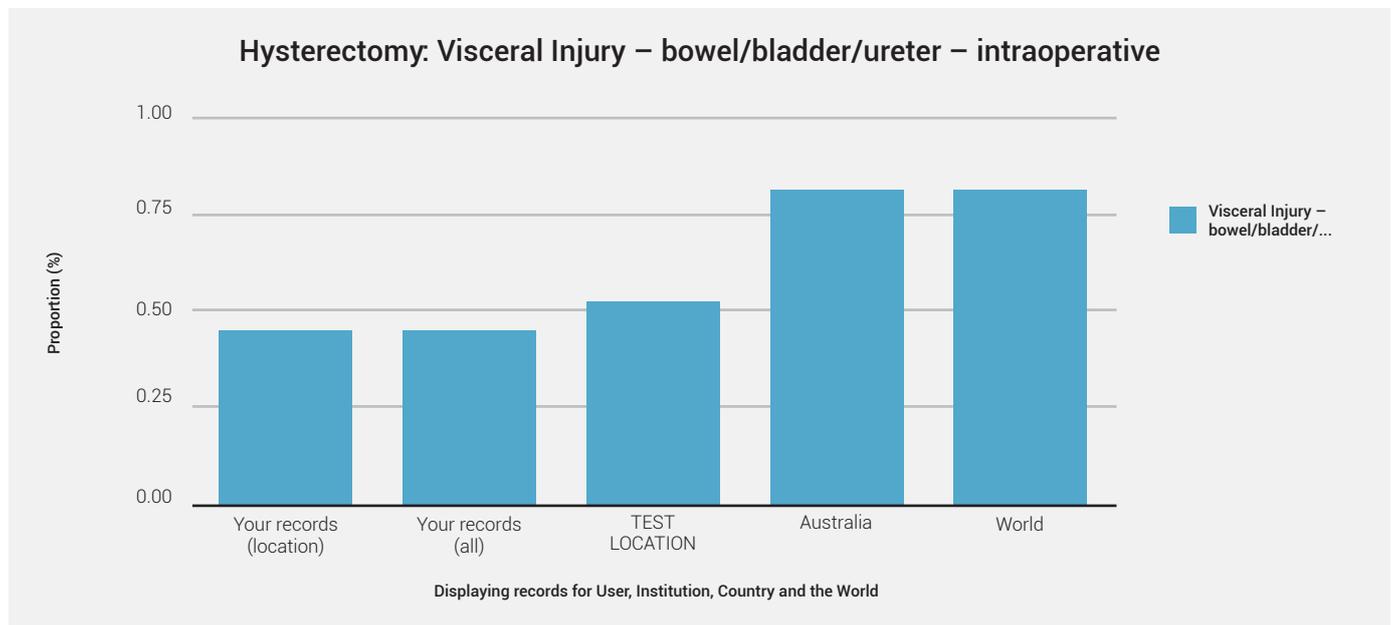
SurgicalPerformance allows you to create lists of patients broken down by surgical procedure, location of practice (compare outcomes from different hospitals), time period and any outcome.

These lists can be printed or exported into excel format for further processing (you may wish to add another variable to it and conduct your own research). In effect, you hold ownership of your data 24/7.

### Bar Chart

A bar chart is a chart with rectangular bars where the length of each bar is proportional to the value it represents. The bars can be plotted vertically or horizontally.

You can plot a bar chart yourself using your patient data, but you are only able to plot one bar (on the frequency of your own outcomes).



In addition to what you could do on your own, SurgicalPerformance will also show you the averaged outcomes of your peers within your institution (hospital), in Australia and in other parts of the world.

Examples include the number of procedures, or the number of conversions from laparoscopic to open surgery. If your outcomes is x%, SurgicalPerformance will tell you how well your outcomes compare with your peers. The figure above gives you an example of how bar charts look in SurgicalPerformance.

## CUSUM (or cumulative sum control chart)

Is a sequential analysis technique described by E. S. Page (University of Cambridge) and is used to monitor changes over time.

The outcomes that can be analysed by CUSUM must be binary (yes/no). Outcome variables that are continued or are expressed in more than two categories (nil, mild, moderate, severe) are not applicable for CUSUM analysis.

In addition, CUSUM requires an upper and a lower limit of normal. CUSUM does not compare outcomes with your colleagues. Rather, it describes your outcomes over time.

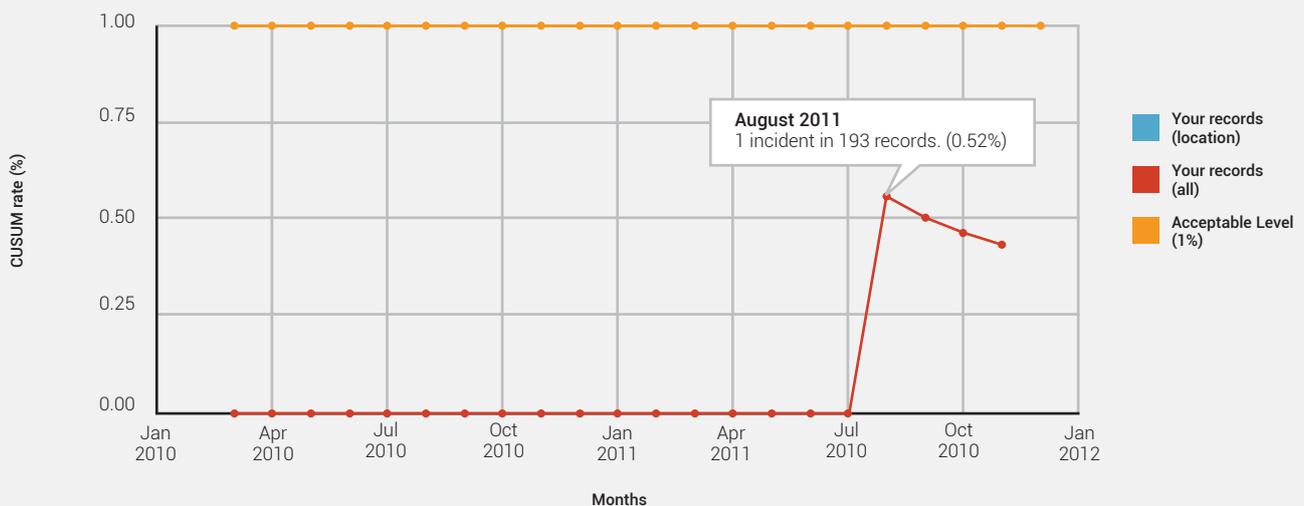
If you are in a learning phase, at some stage you will want to demonstrate that you mastered the new technique and your learning curve has flattened out. Initially you will make errors and unwanted outcomes may be more frequent. However, as you keep trying, your results will improve. CUSUM is the perfect graphical tool to show that.

You can plot a CUSUM chart yourself. For every procedure that you do, you will draw a dot and move the chart towards the right. If the procedure goes well (no adverse event) the dot will move sideways.

For every procedure with an adverse event, the dot will move sideways and upwards one unit. An example is shown below.

Where does analysis with CUSUM make sense?

### CUSUM Report – General Outcome: Visceral Injury – bowel/bladder/ureter – intraoperative



## CUSUM & Complication Rates

In the above case, the surgeon had no visceral injury until August 2011. Then she/he had one complication that brings up the rate of intraoperative visceral injury to 0.52%. This type of curve is typical for a competent clinician.

An incidence above the 1% mark would still be understandable if the number of procedures is low. One complication in only 20 cases will bring the complication rate to a whopping 5%.

If a surgeon commences data capture with a complication case, the complication rate will be 100% until a second procedure has been completed successfully. However, if the trend line goes upwards, one would have to consider whether the outcomes are still acceptable.

For surgical training this tool can be used to monitor a surgical trainee's progress. One would expect the curve to go up initially. However, once the learning curve has passed, the curve is expected to flatten out and fall consistently, thus indicating our trainee has now mastered the surgical skills necessary to practice independently.

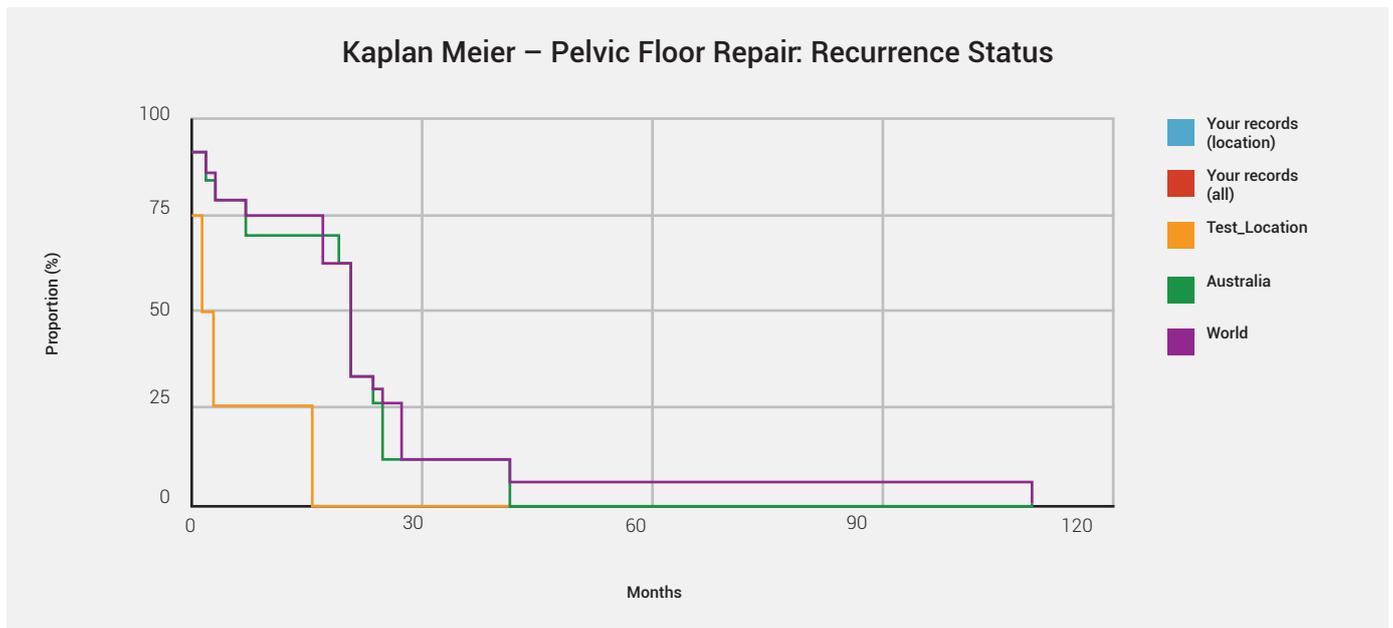
While you can plot CUSUM charts yourself, SurgicalPerformance does it for you within seconds.

## Kaplan Meier

Kaplan Meier (KM) estimates the time to an event and can break down those times for different patients groups.

In our context, KM can analyse time to the recurrence of a symptom (urinary incontinence, recurrence of endometriosis) and in oncology we use KM curves to compare patients with different risk profiles (stage 1 vs. stage 3) or different treatments (surgery vs. surgery plus chemotherapy).

The example below is a KM curve comparing "time to recurrence" of patients who had surgery for pelvic organ prolapse. Similar curves can be calculated for patients who had surgery for endometriosis.



Theoretically, you could plot KM curves on a sheet of paper yourself. In practical terms, this would be way too complicated to do by hand. SurgicalPerformance will calculate real-time KM curves on time-dependent outcomes for you within split seconds.

To learn more about SurgicalPerformance click [here](#).

What's  
next?

Now that you understand the **basic methods of introducing metrics of treatment-related health outcomes** into your practice, read on to Chapter three; **Morbidity & Mortality Meetings**.

# Morbidity and Mortality Meeting

## Discussing cases in confidentiality

In the previous chapters we explored the usefulness of patient surveys and looked at tools used to measure and compare treatment-related health outcomes of patients. In this chapter we will focus on how to effectively leverage Morbidity & Mortality meetings to improve patient care and outcomes.

## Morbidity and Mortality (M&M) meetings

Morbidity and Mortality (M&M) meetings are meetings held by clinicians to review adverse events (complications), which occur during the care of patients. The objectives of an M&M meeting include:

- Providing a safe venue for medical learning.
- Identifying areas of improvement of patient care.
- Identifying errors if any occurred.
- Modifying behaviour and judgment.
- Identifying systems issues that could affect patients' care negatively.
- Teaching on quality improvement and medico legal issues.
- Fostering a climate of openness and discussion about medical errors.

## Confidentiality and Privileged status

Properly run M&M meetings are non-punitive and focus on improving patient care rather than serving to threaten clinicians. Ideally, the meetings are held under "privileged status".

In effect, this means the proceedings of the meeting cannot be used or subpoenaed by courts. The aim is that clinicians can speak freely about a case, and do not need to be concerned about their openness being used against them legally.

In many countries including Australia (Part VC, Health Insurance Act 1973) and the U.S. (O.C.G.A. § 31-7-130 et seq. and § 31-7-140 et seq.), M&M meetings can apply for privileged status to the Federal Government. Minutes cannot be accessed openly and will not be distributed.

Should an application for privileged status be rejected, many M&M meetings still go ahead but they chose not to have any minutes taken at the meetings. In that case, only action points are documented without naming individuals. M&M meetings occur in regular intervals.

## Participants

- Chairperson.
- All Faculty, trainees and medical students are expected to attend.
- Anyone involved in the case with direct knowledge of the systems and events relevant to the discussion. (This may include other physicians, nurses, pharmacists, therapists, lab personnel, and representatives of ancillary departments.)
- Anyone who is not directly involved in patient care or who may be perceived as a "monitor" should not be invited to accept membership of a M&M Meeting.

## Case Selection

- Inpatients or outpatients.
- Any adverse outcome that might have been due to, or worsened by error or system problems.
- A “near-miss” event where there was an error or misstep in care delivery that did not, but could have led to a poor patient outcome.
- Any case where treatment was withheld or delayed, which may have led to suboptimal patient outcomes.
- Any interesting and unique cases which may provide a learning and inquiry opportunity.

Typically, cases will be presented where an action is associated with an adverse event. However, it is equally important that cases also are included in which non-action is associated with harm to patients.

The following indicators might be of assistance with case selection:

## Obstetrics Indicators<sup>1</sup>

<sup>1</sup> Source: ACOG, 2000, Quality Improvement in Women's Health Care (amended)

- Maternal Mortality within 30 days from delivery
- Unplanned readmissions within 30 days
- Maternal cardiopulmonary arrest
- Unplanned removal, injury or repair of organ during operative procedure
- Excessive maternal blood loss
- Excessive length of stay
- Eclampsia
- Unattended delivery
- Unplanned postpartum return to the operating theatre
- Caesarean delivery for uncertain foetal status
- Caesarean delivery for failure to progress
- Elective induction < 39 weeks gestation
- Neonatal Indicators
- Birth trauma
- Unexpected Intrauterine foetal demise & or term stillborn

## Gynaecological Indicators

- Mortality within 30 days from surgical procedure
- Unplanned readmission within 30 days from surgical procedure
- Cardiopulmonary arrest
- Unplanned admission to intensive care unit
- Unplanned return to the operating room during the same admission
- Day-surgery patient admitted or retained for complication of surgery or anaesthesia
- Excessive blood loss
- Unplanned removal, injury or repair of organ during operative procedure
- Discrepancy between preoperative diagnosis and postoperative tissue report
- Removal of follicular cyst or corpus luteum of ovary
- Hysterectomy performed on woman younger than 30 years of age except for malignancy

## Ground Rules

- No finger-pointing – focus on systems of care rather than individual errors
- Confidentiality – avoid patient identifiers (no names, dates, record numbers) and do not discuss casually outside the conference
- Add the following statement to all documents: “Privileged & Confidential: Subject to Peer Review and Medical Review Protections under Federal Law”.

## Conference Format

- The presenter submits a presentation (powerpoint) of the case to the chairperson
- Chairperson will review the case in advance and is prepared for the topic
- Chairperson opens the M&M meeting and makes all participants aware of the confidential nature of the meeting
- Introduction of presenter
- Case presentation including overview of the case, timeline of events, how the patient care issue(s) caused potential or actual harm to the patient, family, or a healthcare professional (presentation should not exceed 10 minutes)
- Identify any evidenced-based literature that is applicable (provide copies to participants)
- Identify any professional standard's body guidelines
- Chairperson will facilitate a discussion amongst the participants
- Name "Take Home Points"
- Recommend any clinical or system changes that should be considered to prevent this patient care issue from occurring in the future
- The entire discussion will not take longer than 15 to 30 minutes

## Root Cause Analysis

Root Cause Analysis is a technique used for very complex cases and that helps answer the question of why the problem occurred in the first place and seeks to identify the origin of a problem. It uses a specific set of steps, to find the primary cause of the problem, so that you can:

- Determine what happened.
- Determine why it happened.
- Figure out what to do to reduce the likelihood that it will happen again.

Often, there are three basic types of causes:

**Physical causes** - Tangible, material items failed in some way (for example, the foetal monitor stopped working).

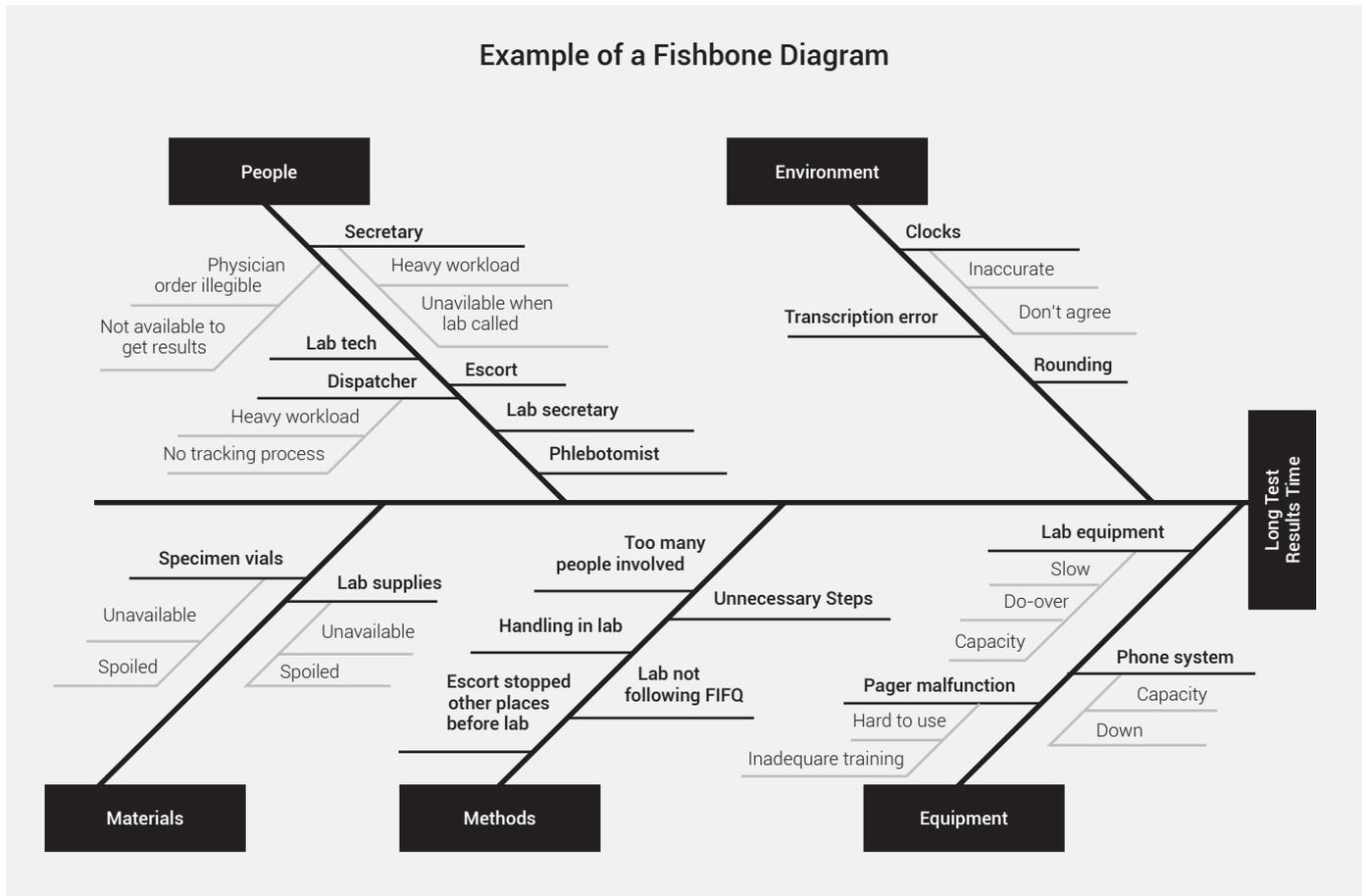
**Human causes** - People did something wrong or did not do something that was needed. Human causes typically lead to physical causes (for example, no one checked to be sure the maintenance was performed on the foetal monitor, which led to it failing).

**Organizational causes** - A system, process, or policy that people use to make decisions or do their work is faulty (for example, no one person was responsible for maintenance, and everyone assumed someone else had checked the foetal monitor).

## Fishbone Diagram

A Fishbone Diagram can assist with the analysis of the root cause:

- Draw the diagram with a process arrow to the effect and draw a box around it.
- Decide what the major categories of the causes are (i.e., people, machines, measurement, materials, methods, environment, policies, etc.).
- Label categories important to your situation. Make it work for you.
- Brainstorm all possible causes and label each cause under the appropriate category.
- Analyse causes and eliminate trivial and/or frivolous ideas.
- Rank causes and circle the most likely ones for further consideration and study.
- Investigate the circled causes.



## What's next?

I hope you enjoyed chapter three of our e-tutorial, which explored the role, objectives and processes of **Morbidity & Mortality meetings** for improving your clinical outcomes. The final chapter will explore how **effectively using checklists can help you to reduce errors before, during and after surgical procedures**

# Checklists

The final chapter in the E-tutorial deals with the issue of checklists.

In the previous three chapters we have explored the usefulness of patient surveys, tools to measure and compare treatment-related health outcomes of your patients, and a comprehensive guide on how to establish a Morbidity & Mortality meeting in your hospital meetings to improve patient care and outcomes.

## Why Checklists?

Checklists help to reduce human errors that can occur as a consequence of limited human memory. Before a patient is taken to operating theatre there are a large number of tasks, which must be completed (far too many to remember). By using a "tick box" checklist, you can ensure the consistency and completeness of a series of important tasks.

In the medical field checklists have been slowly introduced. Recently, surgical checklists were introduced as a mandatory task prior to surgery in Australian operating theatres. While this is a great step forward, some of those checklists may not actually assist the surgeon in completing her/his tasks.

As the surgeon you will support the official hospital checklist, but nobody will argue with you if you run your own checklist in addition to the official hospital checklist. I provide some hints below on how to develop "private" checklists, which you can employ whether you work in the public or in a private hospital system.

## How did Checklists Develop in the Aviation Industry?

In 1934 the US Army tested three models of aircraft. Boeing was the hottest contender. A test flight was part of the exercise. Boeing's model 299 had an uneventful take off, a smooth climb but suddenly stalled and crashed, killing several people.

An investigation found that the pilot forgot to release a lock prior to take off. The public opinion was that the proposed new plane was "too much plane for one man to fly." Pilots sat down and put their heads together. They decided what was needed was some way of ensuring that everything was done; that nothing was overlooked.

What resulted was a pilot's checklist. Actually, four checklists were developed - takeoff, flight, before landing, and after landing. The Model 299 wasn't "too much airplane for one man to fly", it was simply too complex for any one man's memory. These checklists for the pilot and co-pilot made sure that nothing was forgotten. (<http://www.atchistory.org/History/checklst.htm>).

## The Role of Checklists in Surgery

Surgery is a complex task consisting of multiple steps that require input from a multitude of staff. "Complex" means that unforeseen things can happen easily - Expect the Unexpected. Every case is somehow different and an endless number of factors may influence what happens throughout an operation.

We may all experience that a surgical case runs smoothly if we work with regular staff, and a case can become difficult if we must verbalise and demonstrate every small detail to new members of the surgical team.

Surgical checklists help to ensure that certain tasks, which need to be done have actually been carried out. The aim is to reduce the "forgetting" of a task, which could have rather serious consequences.

In surgery, a number of papers have been published recently and I consider the following two particularly relevant to our work.

### **Study No. 1**

The study published in 2009 was conducted by WHO, and had a heavy focus on the quality of surgery in developing countries (Haynes AB et al; N Engl J Med 2009; 360(5):491ff). The group of authors collected data on clinical processes and outcomes from almost 8000 patients.

Key findings included:

- After the introduction of a checklist the perioperative death rate reduced from overall 1.5% to 0.8%.
- Inpatient complications occurred in 11.0% of patients at baseline, and in 7.0% after introduction of the checklist.

However, the study is often criticised because of some severe shortcomings, i.e.:

- The study design was not randomised but compared outcomes before and after the intervention.
- Confounding factors that could have influenced outcomes were not considered.
- Some hospitals which strictly adhered to the checklist had no improvement in outcomes, whereas other hospitals with bad compliance had great improvements.

Nevertheless this study was considered exemplary by the Royal Australian College of Surgeons and has been used by healthcare administrators to hand down surgical checklists in Australian hospitals.

### **Study No. 2**

Researchers in this Dutch study developed 11 checklists and examined nearly 100 items (displayed in table 1 on page 20), and overcame most of the shortcomings identified in the WHO paper discussed above (de Vries EN, et al. N Engl J Med 2010;363:1928-37).

The checklists applied not only to the operating theatre, but also covered pre- and postoperative areas, the ward, the surgeon, anaesthetist and nursing staff. Most importantly, the study included a control group.

The results were conclusive:

- Audit reduced the proportion of patients with at least one complication from 15.4 to 10.6%.
- Consistent with the WHO study, perioperative mortality dropped from 1.5 to 0.8%.

In this study, compliance with the checklist did correlate with improvements in health outcomes. Patients with incomplete checklists had significantly more complications than those for whom checklists were completed.

This study is sufficient proof that checklists are effective in decreasing not only the risk for surgical complications, but also death from surgery.

## How do surgical checklists work?

In short, no one knows conclusively. What we do know is they have direct effects and indirect effects.

### **Direct effects:**

If a specialist forgets to take a "blood group and hold" and the patient sustains a vascular injury, the blood loss would be higher, which could cause further problems (respiratory failure, wound breakdown, cerebral oedema, etc).

If a "group and hold" is available, red cells can be transfused quicker and secondary problems as a consequence of anaemia would be less pronounced.

### **Indirect effect:**

If a surgical team realises that a case is subject of review, the entire team would focus very hard on the case and try to get every detail right ("Hawthorne effect"). The checklist would counteract the effects from "normal" distraction.

## Are checklists specific to the environment?

They most definitely are. We suggest that you accept that checklists are essential and the current standard. You will also need to accept that checklists must cover more than just the operating theatre. However, the environment you work in (i.e. public vs. private; what resources are available to you; etc.) will definitely shape the checklist that makes most sense for you.

I work part time in a public hospital and as such I have no ownership of the checklist that we run at that hospital. I'm a very small wheel that forms part of a large organisation and I will fulfill my duties to the best of my ability. The checklist, which the health department supports is available in that hospital.

I also work as a private practitioner (visiting medical officer; VMO) at a private hospital, but I am not employed by the hospital. My practice is organised through my surgery. I employ staff to assist me. In theatre we still use the (WHO) hospital checklist, and in addition I run my own checklists independently. The overlap of those checklists is minimal. Below is the checklist developed for SurgicalPerformance.

## Table 1: Checkpoints

Checkpoint	What to check	Time point
Surgeon	<p>Is surgery the best option? Is the patient medically fit for surgery; Allergies; Prosthesis; Anticoagulation/blood thinning medication (herbs); how recent is a PAP smear;</p> <p>Is an ICU bed necessary; Is frozen section required; Is bowel prep required; Airways issues for intubation;</p> <p>Order blood tests, medical imaging</p>	Primary consultation
Surgical Team (together)	<p>Correct patient, procedure, site re-confirmed with patient awake; blood group and hold available; reiterate significant surgical &amp; medical history (allergies); medical imaging required &amp; available; pregnancy test negative.</p>	Pre-anaesthetic Bay
Surgeon	<p>Positioning of patient; surgical equipment present in OT; Bean bag/warm cloud on the operating table;</p>	Operating theatre
Surgeon	<p>Procedure documented; instructions regarding drains, medication (anticoagulation), imaging, diet, wound care, mobilisation, voiding, NG tube.</p>	Operating theatre postoperatively
Anaesthetist	<p>Instructions regarding iv fluids, medication, anticoagulation, pain control; Concerns discussed about observations; Tests to be performed.</p>	Operating theatre postoperatively
Surgeon	<p>Intraoperative findings explained; VTE prophylaxis and analgesia charted and explained to patient; Instructions regarding drains, iv therapy, diet, mobilisation handed over to nurse.</p>	Postoperative ward round
Ward medical officer	<p>Pathology test discussed if available; instructions regarding wound care, diet, mobilisation, drains, anticoagulation, passing flatus, voiding; stoma; discharge medication charted; follow up appointment made; discharge summary done. Above instructions explained to patient and discharge information handed out.</p>	Prior to discharge
Nurse	<p>Discharge medication handed out; follow up appointment (or other specialists) checked;</p>	At discharge
Practice nurse	<p>Follow-up on the phone regarding pain, wound, bodily functions.</p>	3 to 5 days following discharge

## Are checklists specific to the environment?

*(continued)*

To conclude, we know checklists help to reduce human errors due to lapses in memory and ensure important actions have been taken before, during and after surgery. By adopting the use of a "tick box" checklist, you can ensure the consistency and completeness of a series of key tasks and continue to improve your surgical performance.

This brings us to the end of our four-part e-tutorial on developing an effective QA program.

## What has been covered

In Chapter 1 - "**The Patient Perspective**" - we learned how to collect information to assess how well we perform from a patient's perspective, and how our patients believe we can improve their experience during their health care episode.

Following this, Chapter 2 explored Metrics, where we discussed the most basic methods of **introducing metrics of treatment-related health outcomes** into our practice to get the most from our patient data.

In Chapter 3 we focused on the issue of **Morbidity & Mortality (M&M) meetings**, where we examined case selection, ground rules and the format of M&M Meetings. Here we also touched some issues surrounding confidentiality.

Finally, in Chapter 4 we explained how effectively using **checklists** can help us to reduce errors before, during and after surgical procedures.

**Are you the best surgeon you possibly could be?** Accept help with SurgicalPerformance. I hope you thoroughly enjoyed this tutorial series and welcome any comments or feedback to [ao@surgicalperformance.com](mailto:ao@surgicalperformance.com).

All the best!

